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(54) Title: METHOD AND APPARATUS FOR PERFORMING FINANCIAL TRANSACTIONS USING A MOBILE COMMUNICATION UNIT		
<pre> sequenceDiagram participant CMU as CUSTOMER MOBILE UNIT 32 participant MCR as MERCHANT CASHIER REGISTER 34 participant FTH as FINANCIAL TRANSACTION CLEARINGHOUSE 36 CMU->>MCR: PROVIDE TRANSACTION INFORMATION AND TRANSACTION ID AND REQUEST FINANCIAL ID AND AUTHORIZATION MCR->>FTH: ADVISE OF TRANSACTION AND SPECIFY TRANSACTION ID FTH->>MCR: MATCHES TRANS. ID'S AND VERIFIES THAT FINANCIAL ACCOUNT SPECIFIED BY FINANCIAL ID HAS SUFFICIENT CREDIT/DEBIT CAPACITY MCR->>CMU: VERIFICATION O.K.? CMU->>MCR: VERIFICATION O.K.? </pre>		
(57) Abstract Financial identification codes (ID's) are stored directly within a mobile communications unit (12) such as a mobile telephone or other device provided with wireless telephony capability such as a personal data assistant, a laptop computer, a dedicated Internet access device, or electronic organizer. The financial ID's represent credit or debit accounts, digital money or other financial entities. Storage of financial ID's within such devices allows the various financial ID's of credit (28) and debit accounts (30) of a customer or of digital money to be consolidated and used efficiently. The ID's are transmitted by radio or infrared signals to a merchant (14) or other party to enable quick and efficient transactions such as purchase transactions. Radio transmission is particularly advantageous for conducting transactions during a mobile telephone call which might otherwise require verbally reciting the financial ID of a credit or debit account.		

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METHOD AND APPARATUS FOR PERFORMING FINANCIAL TRANSACTIONS USING A MOBILE COMMUNICATION UNIT

BACKGROUND OF THE INVENTION

I. Field of the Invention

The invention generally relates to mobile communication units such as mobile telephones and to devices for implementing financial transactions.

II. Description of the Related Art

Consumers increasingly use credit cards, debit cards (such as automated teller machine (ATM) cards), and the like for performing financial transactions with merchants to purchase goods or services. Typically, the consumer provides the credit or debit card to the merchant who runs it through a card scanner to read out a financial identification (ID) associated with the card. The financial ID and the cost of the goods or services are forwarded over a telephone network (such as the public switched telephone network PSTN)) to the bank or other entity providing the credit for the credit card or maintaining the money associated with the debit card. The bank verifies that there is sufficient credit or debit capacity for the transaction and forwards verification to the merchant. The consumer then is typically asked to sign a receipt for the purchase and the transaction is thereby completed and the goods or services are conveyed to the consumer.

Among the advantages of this common type of financial transaction is that the consumer need not carry significant amounts of cash for making purchases and may take advantage of any credit granted to him or her. Disadvantages, however, remain. Consumers typically carry numerous credit and debit cards which can be lost or stolen and are often left accidentally with the merchant. Moreover, the financial ID associated with the card is typically recorded on a magnetic strip on the back of the card which can be accidentally erased or otherwise rendered unreadable. Often, purchases are made using credit or debit accounts over the telephone. In such case, the customer must read the financial ID for the account aloud and the merchant must transcribe the financial ID. This is, at best, a tedious and time consuming process and frequent errors occur in reading or transcribing the financial ID's. Moreover, the financial ID may be captured by

unauthorized parties by eavesdropping. Indeed, the party representing itself as the merchant may merely be fraudulently obtaining financial ID's without intending to provide any goods or services. If the purchase is initiated over the Internet, the financial ID is typically conveyed over the Internet via computer transmission signals which again are subject to eavesdropping.

Accordingly, it would be desirable to consolidate all of the financial ID's associated with all of the credit and debit cards of a consumer in a single device not subject to magnetic erasure thereby minimizing the likelihood of misplacing one of the cards and eliminating the risk of having the financial ID accidentally erased. It would also be desirable to consolidate the financial ID's in a device allowing the ID's to be transmitted efficiently such that the financial ID need not be read and transcribed verbally and allowing the financial ID's to be transmitted in an encrypted or otherwise protected form to minimize the risk that the financial ID's may be captured by eavesdropping. Aspects of the invention are directed to solving these and other problems.

To partially address some of these problems, it has been proposed to store the financial ID of a particular credit or debit account on a Smart Card. A Smart Card is similar to a credit card in size and shape but includes electronic circuitry, perhaps in the form of a small microprocessor, for controlling operation of devices receiving the Smart Card and for storing information such as financial ID's. In one possible implementation, the Smart Card is configured to enable telephony operations of the mobile telephone and is also configured to store the financial ID of a single credit or debit account. To effectuate a financial transaction, the Smart Card is removed from the mobile telephone and provided to a merchant for insertion into a Smart Card reader for reading the financial ID therefrom. Although, the use of such a Smart Card has the advantages that the financial ID cannot be easily erased and may be output subject to appropriate encryption, many of the other disadvantages of conventional credit and debit cards remain. For example, depending upon the implementation, a separate Smart Card may be required for each separate credit and debit account and the separate cards are thereby subject to being lost or stolen. Moreover, the consumer may need to terminate a telephone call to allow the Smart Card to be removed from mobile telephone to effectuate the transaction. Finally, because the Smart Card must be inserted into a reader provided by the merchant, no clear advantages are gained for financial transactions conducted over the telephone or using the Internet.

Accordingly, it would be desirable to provide a more effective integration of mobile telephony and financial ID transactions and it is to that end that further aspects of the invention are drawn.

Finally, there is an movement toward enabling the use of digital money for purchase transactions. Digital money constitutes packets of data containing financial ID's defining certain quantities of money that can be transferred from computer to computer. Digital money differs from credit or debit money in that it is not tied to any external real world account. Rather, digital money is the cyberspace equivalent of cash. It would be desirable to provide the aforementioned integration of mobile telephony and financial ID transactions in a manner that enables and facilitates digital money transactions and it is to that end that still further aspects of the invention are drawn.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention, financial ID's are stored directly within a mobile communications unit such as a mobile telephone or other device provided with wireless telephony capability such as a personal data assistant (PDA), a laptop computer, a dedicated Internet access device, or an electronic organizer. The financial ID's represent credit or debit accounts, digital money or other financial instruments. Storage of financial ID's within such devices allows the various financial ID's of credit and debit accounts of a customer or of digital money to be consolidated and used efficiently. The ID's are transmitted by radio or infrared signals to a merchant or other party to enable quick and efficient transactions such as purchase transactions. Radio transmission is particularly advantageous for conducting transactions during a mobile telephone call which might otherwise require verbally conveying the financial ID of a credit or debit account. Moreover, by storing the financial ID's in the mobile communications unit, the ID's are therefore not as easily subject to inadvertent magnetic erasure as with magnetic strip cards, and the risks associated with misplacing individual credit or debit cards are avoided. The financial ID's may be transmitted in an encrypted form to minimize the risk of unauthorized capture. Almost any form of transaction otherwise conventionally handled with credit or debit accounts or digital money may be performed.

In one embodiment, the invention is implemented within a mobile communications unit by a providing a means for storing a financial

identification code and a means for transmitting the financial identification code to effectuate a financial transaction. A means for receiving a signal representative of a requested financial transaction is also provided along with means for retrieving the financial ID in response to the received request signal. To receive selections from the customer, the mobile communications unit is further provided with a means for providing an indication representative of the financial identification codes to a customer and for requesting selection of one to effectuate transaction; and a means for receiving a selection signal representative of one of the financial identification codes. To receive authorization from the customer to complete a transaction, the mobile communications unit further includes a means for providing an indication of the requested financial transaction to a customer and for requesting approval to effectuate the transaction; a means for receiving an authorization signal representative of whether approval is granted for effectuating the transaction; and a means for transmitting the authorization signal.

Depending upon the implementation, the means for receiving signals and the means for transmitting signals may be an infrared receiver/transmitter, a cellular telephone receiver/transmitter for communicating with a cellular base station, or a mobile telephone receiver/transmitter for communicating with a satellite. Means for encrypting signals prior to transmission and for decrypting received signals may also be employed.

In other embodiments, the invention is implemented as a method.

BRIEF DESCRIPTION OF THE DRAWINGS

The features, objects, and advantages of the present invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify correspondingly throughout and wherein:

FIG. 1 is a block diagram of a financial transaction system configured in accordance with an exemplary implementation of the invention wherein the mobile telephone of a customer has financial ID's stored therein and wherein signals relevant to a purchase transaction are transmitted between the mobile telephone and a merchant cashier register via a cellular telephone system;

FIG. 2 is a flowchart illustrating the steps performed by the system of **FIG. 1** to effectuate a financial transaction in accordance with a first method

wherein a financial ID is transmitted from the mobile telephone to a financial transaction clearinghouse;

FIG. 3 is a block diagram illustrating the mobile telephone of FIG. 1 and showing a financial ID selection display;

FIG. 4 is a block diagram illustrating the mobile telephone of FIG. 1 and showing an authorization display;

FIG. 5 is a timing diagram summarizing, at a high level, steps performed by the system of FIG. 1;

FIG. 6 is a timing diagram summarizing, at a high level, a second method wherein the financial ID is transmitted from the mobile telephone to the merchant cashier register;

FIG. 7 is a block diagram of a financial transaction system configured in accordance with a first alternative implementation of the invention wherein signals relevant to the financial transaction are transmitted between the mobile telephone and the merchant cashier register via a satellite-based mobile telephone system;

FIG. 8 is a block diagram of a financial transaction system configured in accordance with a second alternative implementation wherein signals relevant to the transaction are transmitted between the mobile telephone and the merchant cashier register via infrared signals;

FIG. 9 is a block diagram of a financial transaction system configured in accordance with a third alternative implementation and wherein signals relevant to a transaction initiated during a telephone call are transmitted between the mobile telephone and the merchant cashier register via a cellular telephone system;

FIG. 10 is a timing diagram summarizing, at a high level, steps performed by the system of FIG. 9 to effectuate a financial transaction in accordance with a first method wherein a credit or debit account is accessed;

FIG. 11 is a timing diagram illustrating, at a high level, steps performed by the system of FIG. 9 to effectuate a financial transaction in accordance with a second method wherein digital money is transferred;

FIG. 12 is a block diagram of a financial transaction system configured in accordance with a fourth alternative implementation of the invention wherein signals relevant to a transaction initiated via the Internet are transmitted between the mobile telephone and a merchant computer via a cellular telephone system connected to the Internet;

FIG. 13 is a timing diagram summarizing, at a high level, steps performed by the system of FIG. 12 to effectuate a financial transaction in

accordance with a method wherein digital money is transferred via the Internet.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the figures, preferred and exemplary implementations of the invention will now be described. Initially, techniques of the invention will be described with reference to **FIGS. 1 - 5** which illustrate a system employing a mobile telephone wherein signals appropriate for implementing an in-person purchase via a credit or debit account are transmitted between a mobile unit and a merchant cashier register or other point of sale unit via a cellular telephone. The transaction is coordinated by a financial transaction clearinghouse with the financial ID of a credit or debit account selected by the customer being transmitted from the mobile telephone to the clearinghouse, rather than to the merchant cashier register. An alternative method for in-person purchases wherein the financial ID is transmitted from the mobile telephone to the merchant cashier register will be described with reference to **FIG. 6**. Then, alternative systems employing satellite-fleet mobile communications or direct infrared communications between the mobile unit and the merchant cashier register for in-person purchases will be described with reference to **FIGS. 7 - 8**. Next, with reference to **FIGS. 9 - 11**, a system for implementing a purchase wherein the purchaser and merchant are remote from one another will be described both for a credit or debit account purchase and for a digital money purchase. Finally, with reference to **FIGS. 12 - 13** a system for implementing a digital money purchase via the Internet using a lap-top computer with mobile telephony capability will be described.

FIG. 1 shows a system **10** for performing a purchase based upon a credit or debit account between a customer (not shown) using a mobile telephone unit **12** and a merchant (also not shown) using a point of sale cashier register **14**. **FIG. 2** illustrates a method performed by the system of **FIG. 1**. **FIGS. 1** and **2** will be described together with the steps of **FIG. 2** provided in parentheses. After the customer verbally indicates a desire to purchase goods or services, the merchant enters purchase transaction information including the amount of the purchase and the telephone number (provided by the customer) of mobile unit **12** into cashier register **14** (**FIG. 2**, step **102**). The cashier register generates a transaction ID and transmits transaction information and the mobile unit telephone number

over a land line 16 connected to the PSTN 17 to a financial transaction clearinghouse (clearinghouse) 18 (FIG. 2, step 104). The transaction information includes, for example, a transaction ID, the identity and cost of the goods or services and an identification of the merchant. Clearinghouse 18 receives and records the information (FIG. 2, step 106), then calls mobile unit 12 using the provided telephone number via a cellular system 20 having a base station 22 in the vicinity of the mobile unit 12 (FIG. 2, step 108).

The purchaser answers the incoming telephone call to mobile unit 12 and thereby allows the mobile unit 12 to receive signals transmitted by the clearinghouse 18 (FIG. 2, step 110). Depending upon the implementation, clearinghouse 18 may transmit signals to the mobile unit 12 via the cellular system specifying the amount of the transaction, the identity of the goods or services, and the identity of the merchant. Clearinghouse 18 also transmits a request for either digital money or a financial ID specifying a credit or debit account and approval to charge the account. The mobile unit 12 receives the signals and presents appropriate displays to the customer to display information received from clearinghouse 18 and to request selection of a credit or debit account or digital money (FIG. 2, step 112). To this end, mobile unit 12 retrieves pre-stored financial information from a memory unit (not shown) within the mobile unit identifying the credit and debit accounts of the customer of mobile unit 12 and any digital money stored therein.

An exemplary display is provided in FIG. 3 within a display screen 24 of mobile unit 12. As can be seen, the exemplary display identifies the merchant, the goods or services and the amount of the purchase and provides three credit card accounts and two ATM (debit) accounts for selection. The credit card accounts may be, for example, VISA, MASTER CHARGE, and AMERICAN EXPRESS accounts and may be identified by appropriate icons in display screen 24. (VISA, MASTER CHARGE and AMERICAN EXPRESS are trademarks of their respective companies.) The ATM debit card accounts may be checking accounts maintained at different banks and may be identified by the bank name or other appropriate icons in display screen 24. The display also shows that the purchase may be made using digital money and specifies the amount of digital money available. Examples involving a digital money purchase will be described below with reference to FIGS. 11 - 13.

The customer enters a selection by, for example, pressing the appropriate button on keypad 26 corresponding to the number of the

selected account (FIG. 2, step 114). In the present example the customer selects credit card no. 2 and is presented with the display of FIG. 4 requesting authorization to bill the amount of the purchase to the selected credit account (FIG. 2, step 116). The customer responds by pressing the appropriate buttons, such as by pressing 1 for YES or 2 for NO. If NO, an appropriate refusal signal is sent to clearinghouse 18 (FIG. 1) via cellular system 20 refusing authorization. The refusal is forwarded to the cashier register and the transaction is terminated. Assuming however, that the customer grants approval by selecting YES, the mobile unit retrieves the financial ID for the selected credit account from an internal memory and forwards the financial ID and an authorization signal to the clearinghouse along with transaction ID (FIG. 2, step 120) via cellular system 20. Although not separately shown, the customer may be required to first enter a personal identification number (PIN) before authorizing the transaction. Also, depending upon the implementation the financial ID may be encrypted, perhaps using a public key encryption system, the details of which are well known to those skilled in the art and will accordingly not be described herein.

Clearinghouse 18 receives the authorization and the selected financial ID from mobile unit 12 along with the transaction ID and contacts the appropriate bank or credit card company to verify that the selected account has sufficient capacity to cover the purchase (FIG. 2, step 122). In FIG. 1, an exemplary set of credit card companies 28 and debit card companies 30 are shown. Communications between clearinghouse 18 and the credit and debit card companies may be via PSTN 17 or any other appropriate communications medium. Assuming that the selected account has sufficient capacity for the purchase, the selected credit account company records the amount of the purchase and the transaction ID and sends a verification signal to clearinghouse 18 for forwarding to the cashier register 14 and to mobile unit 12 (FIG. 2, step 124). Hence, both the customer and the merchant are advised simultaneously of the verification (FIG. 2, steps 126 and 128). Both mobile unit 12 and the cashier register 14 provide an appropriate verification display. The telephone call between clearinghouse 18 and the mobile unit 12 is then terminated. The merchant then conveys the goods or services to the customer and the transaction is completed. Ultimately, the credit card company forwards a bill to the customer for the amount of the purchase and forwards funds to the merchant to cover the purchase.

Thus, the system of FIG. 1 allows for a purchase transaction using, for example, a credit or debit account to be completed easily without requiring the financial ID of the purchasers account to be provided to the merchant and without the use of conventional credit or debit cards which, as noted above, are subject to being lost, stolen or damaged. All of the financial ID's for all of the customers accounts are consolidated in within mobile unit 12 for easy access. Depending upon the implementation, the memory unit of the mobile unit may additionally store the amount of credit or debit remaining, i.e. the account balance, for each credit and debit account. This information may be updated following each transaction. Assuming that all purchases are handled using mobile unit 12, the account balance information stored therein thereby remains correct. If purchases are made separately perhaps using a conventional credit or debit card, the information for a particular account can be updated following each transaction involving that account by transmitting the current account balance from the appropriate credit or debit card company to the mobile unit via the financial transaction clearinghouse. Additions to the amount of money available in a debit account as a result of a deposit may be tracked in much the same manner.

Depending upon the implementation, the signals transmitted to and from mobile unit 12 may be entirely digital and may be embedded in any on-going voice conversation the purchaser may be having using the mobile unit. For example, for cellular telephone systems employing Code Division Multiple Access (CDMA) technology, which encodes all voice signals digitally, the appropriate digital financial transaction signals may be embedded or interleaved in data packets along with voice signals. In this manner, the purchaser need not terminate an on-going voice telephone call. Rather, the purchaser merely pauses briefly during the conversation to review the information displayed regarding the transaction and to press the appropriate buttons for selecting the credit/debit account and for authorizing the purchase.

Also, depending upon the implementation, no financial transaction clearinghouse is required. Rather, merchant cashier register 14 may communicate directly with the appropriate credit card and debit card companies 28 and 30.

The messages exchanged during the performance of the steps of the method implemented by the system of FIG. 1 are summarized at a high level as shown in FIG. 5 which provides separate time lines 32, 34 and 36 showing, respectively, the steps performed by mobile unit 12, merchant

cashier register 14 and financial transaction clearinghouse 18 of FIG. 1. The steps performed during the generation of the messages shown in FIG. 5 have already been described with reference to FIGS. 1 and 2, and will not be re-described.

With the system and method thus far described, the selected financial ID is transmitted directly from the mobile unit to the financial transaction clearinghouse. Hence the merchant never receives the financial ID. This helps maintain the privacy of the financial ID, particularly from unauthorized use by possible unscrupulous merchants. FIG. 6 summarizes a somewhat simpler, alternative method wherein the financial ID is transmitted to the merchant cashier register 14. After the customer indicates a desire to purchase goods or services and provides the telephone number of the mobile unit, the cashier register 14 calls the mobile unit using the telephone number and transmits signals to mobile unit 12 via the cellular system of FIG. 1, at step 20, advising of the transaction and requesting either the financial ID of a credit/debit account or digital money and requesting authorization to complete the transaction. The advise of transaction information includes an identification of the goods or service to be purchased and the cost thereof.

Mobile unit 12 provides appropriate displays such as those illustrated in FIGS. 3 - 4, inputs the appropriate selections from the customer and then, assuming that a credit or debit account is selected, transmits the financial ID of the credit or debit account and an authorization signal to the merchant cashier register, step 202. The cashier register then transmits signals to the financial transaction clearinghouse, step 204, perhaps using land lines as illustrated in FIG. 1, advising of the transaction and providing the financial ID and the authorization signal received from the mobile unit. Again the advice of transaction information includes the cost of the goods or services to be purchased. Clearinghouse 18 forwards the financial ID to the appropriate credit account or debit account company and requests verification that the selected account has the capacity to cover the purchase. Assuming that the selected account has sufficient capacity, a verification signal is received by clearinghouse 18 and then forwarded to the cashier register 14 for completion of the transaction. One particular advantage of performing the method of FIG. 6 is that the telephone number of the mobile unit need not be provided to the merchant for inputting into the cashier register because no telephone calls are made to the mobile unit.

What has been described thus far is a system wherein communication between the cashier and the financial transaction clearinghouse is

performed using the PSTN and wherein communications between the mobile unit and clearinghouse is performed using a cellular telephone system. In general, however, any appropriate forms of communication may alternatively be employed. For example, communication between the cashier register and the clearinghouse may also be via a cellular telephone system. Alternatively, communications may be performed using a satellite-based mobile communications system. Also, communications between the mobile unit and cashier may be performed using an infrared system.

FIG. 7 illustrates a satellite-based system **310** having a mobile unit **312**, a cashier register **314**, a financial transaction clearinghouse **318**, and credit account and debit account companies **320** and **322** all interconnected via a satellite mobile communications system represented by a single satellite **324**. The satellite system may include ground stations not separately shown. All communications between the various units are performed using the satellite system thereby eliminating the need for any land line communications. Any of the transaction methods described above with respect to **FIGS. 1 - 6** may be performed using the system of **FIG. 7** and the methods will not be re-described.

FIG. 8 illustrates an infrared-based system **410** having a mobile unit **412**, a cashier register **414**, PSTN **417**, a financial transaction clearinghouse **418**, and credit account and debit account companies **428** and **430**. As with the system of **FIG. 1** the cashier register, the clearinghouse and the credit and debit account companies are interconnected via the PSTN. However, communication between the mobile unit and the cashier is performed using infrared signals. More specifically, mobile unit **412** has an infrared receiver/transmitter **424** and cashier register **414** has an infrared receiver/transmitter **426**.

In an exemplary transaction performed in accordance with the method of **FIG. 6**, the cashier transmits to the mobile unit via infrared signals the amount of the transaction and an identification of the goods or services. The mobile unit inputs the customers selection of a credit or debit account, receives explicit authorization from the customer, then transmits the financial ID of the selected account and an authorization signal to the cashier register **414** via infrared signals. Transmission and reception of the infrared signals may be entirely in accordance with conventional infrared techniques which are well understood by those skilled in the art and will not be described herein. In an alternative embodiment of the invention, the method of **FIG. 2** is performed using the system of **FIG. 8** whereby the telephone number of mobile unit **12** is exchanged using the infrared link.

Thus far, in-person transaction methods have been described wherein the customer with mobile unit is in the vicinity of the merchant cashier register. In the following, transactions are described wherein the customer is remote from the merchant and initiates the transaction either via a mobile telephone call to the merchant or via an Internet or similar computer network connection. Also, transactions are described wherein digital money is conveyed.

FIG. 9 illustrates a system 510 having a customer mobile unit 512 and a merchant cashier register 514 with telephone 515. The mobile unit is located remote from the cashier and telephone as indicated by a dashed line interposed between them. Cashier register 514 and telephone 515 are connected via a land line 516 to PSTN 517 which, in turn, is connected to a financial transaction clearinghouse 518, cellular system 520 having base station 522, and credit and debit account companies 528 and 530. The customer initiates a purchase transaction by calling the merchant telephone 515 using mobile unit 512 and indicates a desire to purchase goods or services. The merchant enters the selected transaction into cashier register 514 which communicates directly with mobile unit 512 via the open mobile telephone call connection to digitally provide the amount and nature of the transaction to the mobile unit and to digitally requests a financial ID and an authorization signal for completing the transaction. This assumes that a mobile system is employed that allows embedding of digital signals within voice telephone conversation signals such as the aforementioned CDMA system. The customer pauses briefly during his conversation with the merchant to select a credit or debit account and to authorize the transaction in the same manner as described above with reference to FIGS. 3 - 4. Mobile unit 512 retrieves the financial ID of the selected account and transmits the financial ID and an authorization signal digitally to cashier register 514 again via the same mobile telephone call. Cashier register 514 immediately forwards the financial ID and authorization signal to the financial transaction clearinghouse over a second PSTN line (not separately shown). Clearinghouse 518 operates in the same manner as described above to obtain verification that the selected account has sufficient capacity of the purchase. A verification signal is forwarded back to the cashier 514 which displays the verification to the merchant who verbally conveys the verification to the customer using telephone 515. Verification may additionally be transmitted from the cashier register to the mobile unit via the open mobile telephone call. The telephone call is then terminated and the transaction is thereafter completed by providing the goods or services to the customer.

The steps of the method implemented by the system of FIG. 9 are summarized at a high level within FIG. 10 which provides separate time lines 532, 534 and 536 showing, respectively, the steps performed by the mobile unit 512, the cashier register 514 and the financial transaction clearinghouse 518 of FIG. 9.

Hence, a system is provided wherein digital signals pertaining to a purchase transaction are transmitted between a customer mobile unit and a merchant cashier register during a voice mobile telephone conversation between the customer and merchant. This is similar to otherwise conventional telephone purchase transactions using credit or debit accounts, but with the system of FIG. 9 - 10 the customer need not verbally convey the financial ID of a credit/debit account to the merchant during the telephone call. This has the advantage of speeding up the transaction because the customer need not read aloud the financial ID, name and expiration date from a credit card and the merchant need not record that information. Also, mistakes that can commonly occur in reading and transcribing the digits of the financial ID are avoided. Moreover, the unauthorized capture of the financial ID by eavesdropping is minimized. As with previous embodiments, the financial ID may be encrypted to further reduce the risk of unauthorized access.

Thus far, all example transactions described have involved the purchase of goods or services using a credit or debit account selected by the customer. As noted above, however, any of the various transaction methods and systems also allow payment for the goods or services using digital money stored within the mobile unit.

FIG. 11 summarizes a digital money transaction using the system of FIG. 9. FIG. 11 provides separate time lines 632 and 634 showing, respectively, the steps performed by the mobile unit 512 and the point of sale cashier register 514 of FIG. 9. No time line is provided for the financial transaction clearinghouse because no credit or debit account is used and hence account verification is required. Rather digital money is conveyed for the customer mobile unit to the merchant cashier register.

The customer initiates a purchase transaction with the merchant during a voice mobile telephone call from the mobile unit to the merchant telephone, step 636. The merchant enters the purchase transaction information into the cashier register and, in the same manner as described above without reference to FIG. 9, the cashier register transmits digital signals to the mobile unit advising of the transaction and requesting a financial ID and an authorization signal, step 638. The customer is then

presented with a display such as is shown in FIG 3. However, rather than selecting a credit or debit account, the customer presses the appropriate buttons to select the digital money option and to authorize the purchase. Assuming the customer has sufficient digital money stored within the mobile telephone to cover the purchase, the financial ID or ID's of the digital money is transmitted to the cashier register as digital signals embedded within the mobile telephone voice conversation signals, step 640. The cashier register receives and stores the digital money. Hence, the digital money account of the mobile unit is decreased and the digital money account of the cashier register is increased. The completion of the digital money transaction is confirmed by transmitting appropriate verification and receipt signals from the cashier register back to the mobile unit, step 642. The telephone call is then ended and the goods or services are ultimately conveyed to the customer. If the goods or services are for some reason not conveyed, the verification and receipt signals received by the mobile unit of the customer provide proof of the transaction.

Thus far all transactions have been described with reference to systems employing mobile telephones capable of voice conversation telephone calls. As noted above however, purchase transactions can be performed in accordance with the invention using other types of mobile communications units such as laptop computers and PDA's configured with mobile transmitter/receivers. FIG. 12 provides an example of a system employing a laptop computer wherein a purchase transaction is performed over the Internet. FIG. 13 illustrates a method using the system of FIG. 12 wherein the purchase is made with digital money.

FIG. 12 illustrates a system 710 having a mobile laptop computer unit 712 and a merchant computer 714 located remote from one another. Merchant computer 714 is connected via a land line 716 to a PSTN 717 which is in turn connected to a financial transaction clearinghouse 718, the Internet 719 and a cellular system 720 having a base station 722. The clearinghouse is additionally connected to various credit account and debit account companies 728 and 730.

The customer initiates a purchase transaction by contacting the merchant computer via the cellular system and the Internet. In this regard, the laptop computer employs a modem (not separately shown) in connection with a mobile receiver/transmitter (also not separately shown) to contact the merchant computer via base station 722, cellular system 720, Internet 719 and PSTN 717 perhaps to access World Wide Web page maintained by the merchant. In any case, the customer selects goods or

services to be purchased by entering the appropriate commands into laptop 712 for transmission to merchant computer 714.

The merchant computer receives the customers purchase selection and transmits appropriate signals confirming the purchase selection and requesting a financial ID and an authorization signal. As with the other embodiments described above, the customer may select a credit or debit account or a quantity of digital money. If the former, the financial ID of the account is transmitted via the Internet, preferably encrypted, to the merchant computer for forwarding to the financial transaction clearinghouse, perhaps also via the Internet, for verification of adequate credit or debit account capacity. Appropriate, verification signals are sent to the merchant computer and forwarded to the customers laptop computer. If the purchase is via digital money, the financial ID defining the needed quantity of digital money is transmitted over the Internet to the merchant computer, again preferably encoded in some manner to prevent unauthorized capture, and appropriate verification and receipt signals are sent back to the customer. With the digital money transaction, no signal need be sent to the clearinghouse.

FIG. 13 summarizes the digital money transaction using the system of FIG. 12. FIG. 13 provides separate time lines 732 and 734 showing, respectively, the steps performed by the laptop 712 and merchant computer 714 of FIG. 12. Again, no time line is provided for the financial transaction clearinghouse because no credit or debit account is used and hence account verification is required.

Various exemplary systems and methods for performing financial transactions such as purchase transactions using a mobile telephone or other mobile communications unit configured to store the financial ID's of various credit and debit accounts and/or quantities of digital money have been described. In accordance with the principles of the invention, a wide variety of other financial transactions may be performed as well including, in general, almost any transaction otherwise handled with credit or debit cards or digital money. Although the examples provided wherein relate to mobile telephone or laptops computers, principles of the invention can be applied to almost any type of mobile communications unit including, the aforementioned PDA's, mobile Internet access devices, etc.

The exemplary embodiments have been primarily described with reference to block diagrams illustrating apparatus elements and timing diagrams and flow charts primarily illustrating method steps. As to the timing diagrams and flowcharts, each block or step therein represents both a

method step and an apparatus element for performing the recited step. Depending upon the implementation, each apparatus element, or portions thereof, may be configured in hardware, software, firmware or combinations thereof. It should be appreciated that not all components necessary for a complete implementation of a practical system are illustrated or described in detail. Rather, only those components necessary for a thorough understanding of the invention have been illustrated and described.

Moreover, the previous description of the preferred embodiments is provided to enable any person skilled in the art to make or use the present invention. The various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments without the use of the inventive faculty. Thus, the present invention is not intended to be limited to the embodiments shown herein but is to be accorded the widest scope consistent with the principles and novel features disclosed herein.

WE CLAIM:

CLAIMS

1. In a mobile communications unit, a system for performing a
2 financial transaction comprising:
means for storing a financial identification code; and
4 means for transmitting said financial identification code to
effectuate a financial transaction.

2. The system of claim 1 further including
2 means for receiving a signal representative of a requested financial
transaction; and
4 means for retrieving the stored financial identification code in
response to reception of the signal representative of the requested financial
6 transaction.

3. The system of claim 1 wherein said mobile communications
2 unit is selected from a group consisting of a mobile telephone, a personal
data assistant with mobile telephony capability, a laptop computer with
4 mobile telephony capability, an Internet access device with mobile telephony
capability, and an electronic organizer with mobile telephony capability.

4. The system of claim 1 wherein said financial identification code
2 is representative of digital money.

5. The system of claim 1 wherein said financial identification code
2 is representative of a debit account.

6. The system of claim 1 wherein said financial identification code
2 is representative of a credit account.

7. The system of claim 1 wherein said means for storing a
2 financial identification code stores a plurality of financial identification
codes.

2 8. The system of claim 7 wherein said system further includes --
2 means for providing an indication representative of said
financial identification codes and for requesting selection of one to effectuate
4 transaction; and
 means for receiving a selection signal representative of one of
6 said financial identification codes.

2 9. The system of claim 2 further comprising:
2 means for providing an indication of said requested financial
transaction and for requesting approval to effectuate transaction;
4 means for receiving an authorization signal representative of
whether approval is granted for effectuating said requested transaction; and
6 means for transmitting said authorization signal.

2 10. The system of claim 9 wherein said means for receiving an
2 authorization signal operates to receive a personal identification number
code.

2 11. The system of claim 4 further including
2 means for receiving a signal indicative of a completed financial
transaction; and
4 means for modifying said digital money financial identification
code to reflect the completed financial transaction.

2 12. The system of claim 2
2 wherein said means for receiving the signal representative of the
requested financial transaction includes an infrared receiver.

2 13. The system of claim 1
2 wherein said means for transmitting said financial identification code
includes an infrared transmitter.

2 14. The system of claim 2
2 wherein said means for receiving the signal representative of the
requested financial transaction includes a cellular telephone receiver.

2 15. The system of claim 1
2 wherein said means for transmitting said financial identification code
includes a cellular telephone transmitter.

16. The system of claim 2
2 wherein said means for receiving the signal representative of the
requested financial transaction includes a wireless telephone receiver for
4 receiving signals from a satellite.
17. The system of claim 1
2 wherein said means for transmitting said financial identification code
includes a wireless telephone transmitter for transmitting signals to a
4 satellite.
18. The system of claim 1 wherein said means for transmitting said
2 financial identification code includes a means for encrypting the financial
identification code prior to transmission.
19. In a mobile communications unit, a system for performing a
2 financial transaction comprising:
a memory unit storing a financial identification code;
4 a receive unit receiving a signal representative of a requested
financial transaction;
6 a control unit retrieving the financial identification code in
response the received signal; and
8 a transmit unit transmitting said financial identification code
to effectuate said requested financial transaction.
20. A system for performing a financial transaction comprising:
2 a point of sale unit comprising
means for transmitting a signal representative of a
4 requested financial transaction, and
means for receiving a financial identification code for
6 effectuating said requested financial transaction;
a mobile communications unit comprising
8 means for storing a financial identification code,
means for receiving the signal representative of the
10 requested financial transaction, and
means for transmitting said financial identification code
12 to effectuate said requested financial transaction.

21. In a mobile communications unit, a method for performing a
2 financial transaction comprising the steps of:
storing a financial identification code; and
4 transmitting said financial identification code to effectuate a
financial transaction.

22. The method of claim 21 further including the steps of
2 receiving a signal representative of a requested financial
transaction; and
4 retrieving the stored financial identification code for
transmission in response to reception of the signal representative of a
6 requested financial transaction.

23. The method of claim 21 wherein said mobile communications
2 unit is selected from a group consisting of a mobile telephone, a personal
data assistant with mobile telephony capability, a laptop computer with
4 mobile telephony capability, an Internet access device with mobile telephony
capability, and an electronic organizer with mobile telephony capability.

24. The method of claim 21 wherein said financial identification
2 code is representative of digital money.

25. The method of claim 21 wherein said financial identification
2 code is representative of a debit account.

26. The method of claim 21 wherein said financial identification
2 code is representative of a credit account.

27. The method of claim 21 wherein said step of storing a financial
2 identification code is performed to store a plurality of financial identification
codes.

28. The method of claim 27 wherein said method further includes
2 the steps of
providing an indication representative of said financial
4 identification codes and for requesting selection of one to effectuate said
transaction; and
6 receiving a selection signal representative of one of said
financial identification codes.

29. The method of claim 23 further comprising the steps of:
2 providing an indication of said requested financial transaction
and for requesting approval to effectuate said transaction;
4 receiving an authorization signal representative of whether
approval is granted for effectuating said transaction; and
6 transmitting said authorization signal.

30. The method of claim 21 wherein said step of receiving a
2 authorization signal is performed to receive a personal identification
number code.

31. The method of claim 24 further including the steps of
2 receiving a signal indicative of a completed financial
transaction; and
4 modifying said digital money financial identification code to
reflect the completed financial transaction.

32. The method of claim 22
2 wherein said step of receiving the signal representative of the
requested financial transaction includes the step of receiving an infrared
4 signal.

33. The method of claim 21
2 wherein said step of transmitting said financial identification code
includes the step of transmitting an infrared signal.

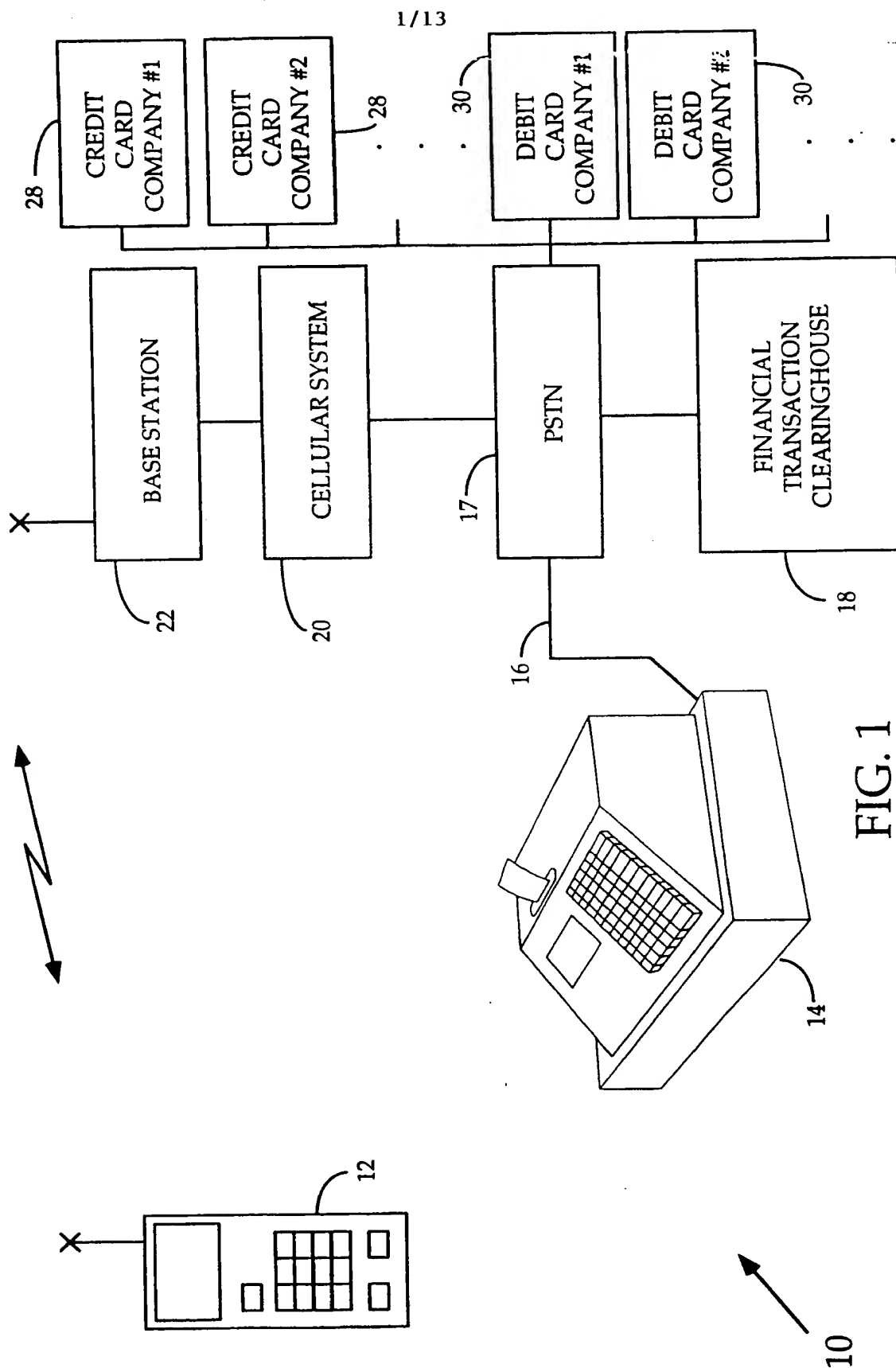
34. The method of claim 22
2 wherein said step of receiving the signal representative of the
requested financial transaction includes the step of receiving a cellular
4 telephone signal.

35. The method of claim 21
2 wherein said step of transmitting said financial identification
code includes the step of transmitting a cellular telephone signal.

36. The method of claim 22
2 wherein said step of receiving the signal representative of the
requested financial transaction includes the step receiving signals from a
4 satellite.

37. The method of claim 21
- 2 wherein said step of transmitting said financial identification code includes the step of transmitting signals to a satellite.

38. The method of claim 21 wherein said step of transmitting said
- 2 financial identification code includes the step of encrypting the financial identification code prior to transmission.



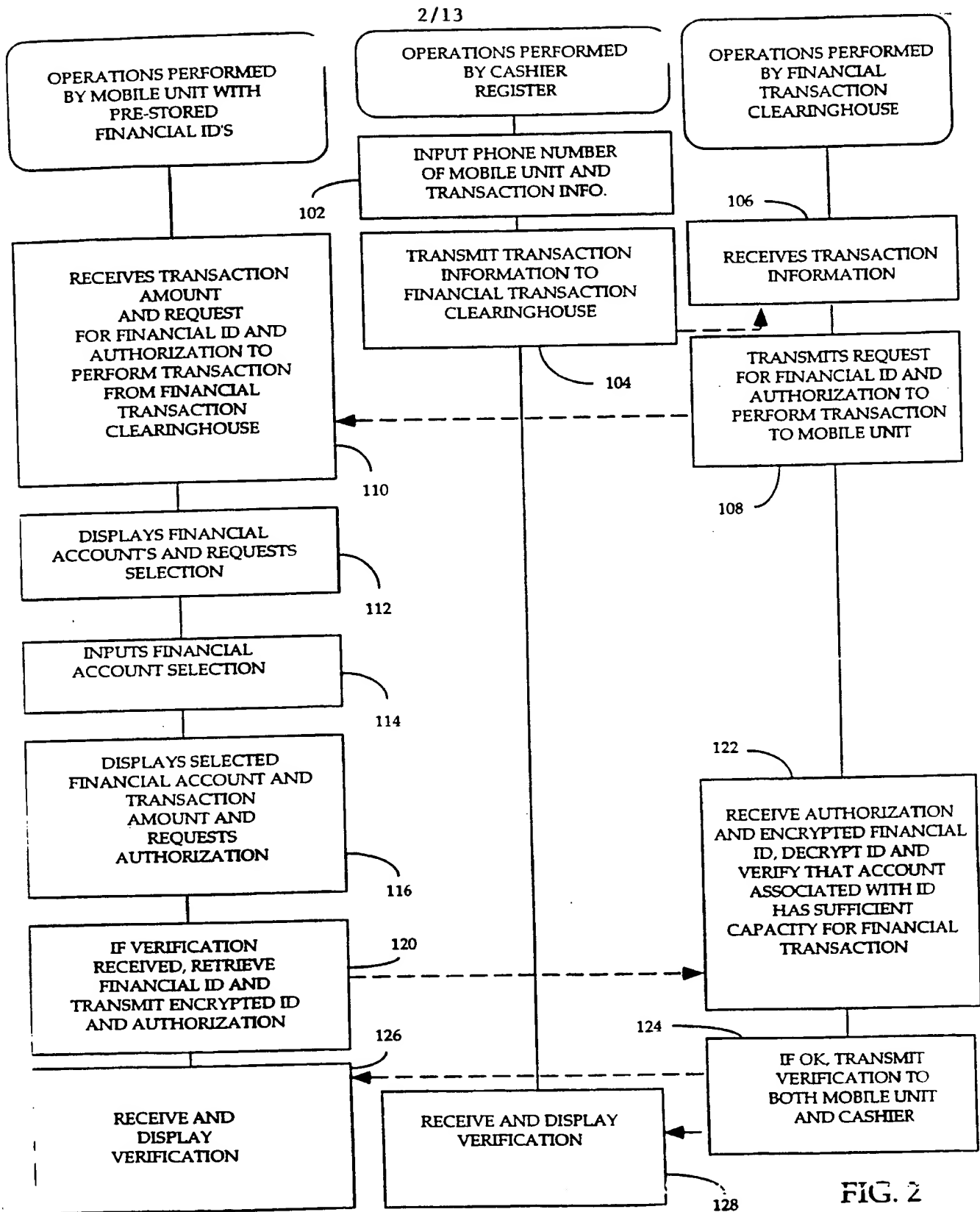


FIG. 2

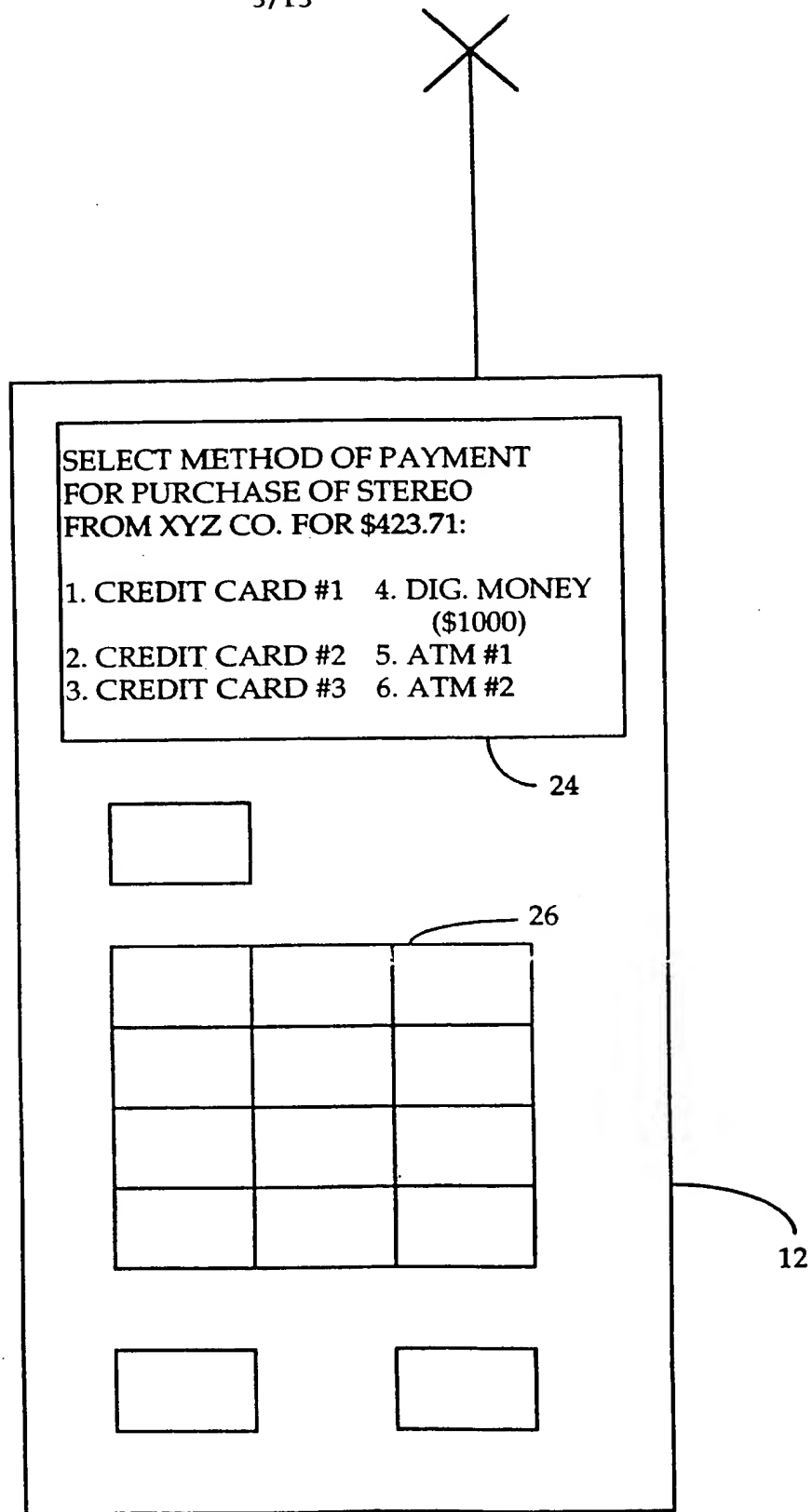


FIG. 3

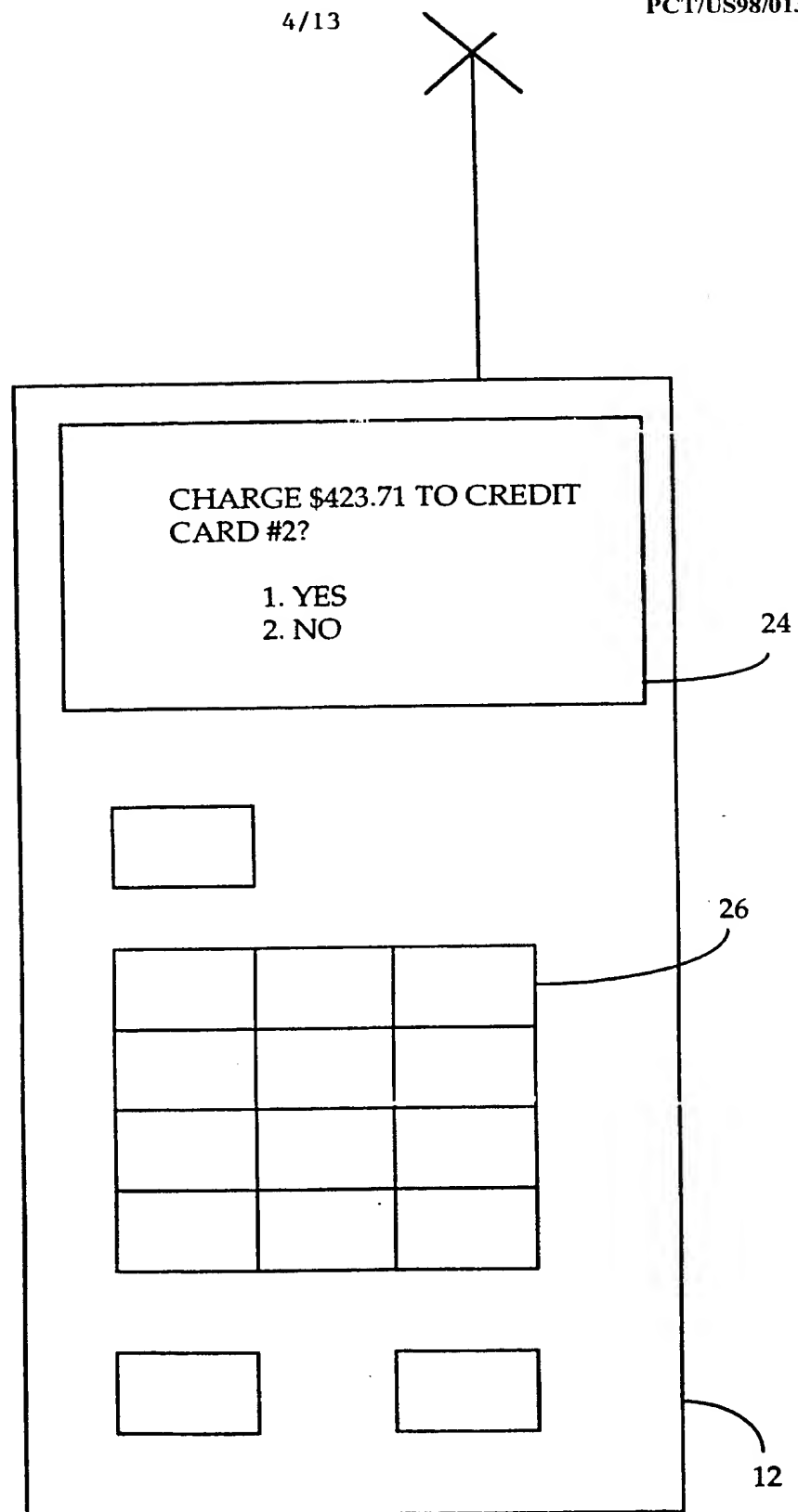


FIG. 4

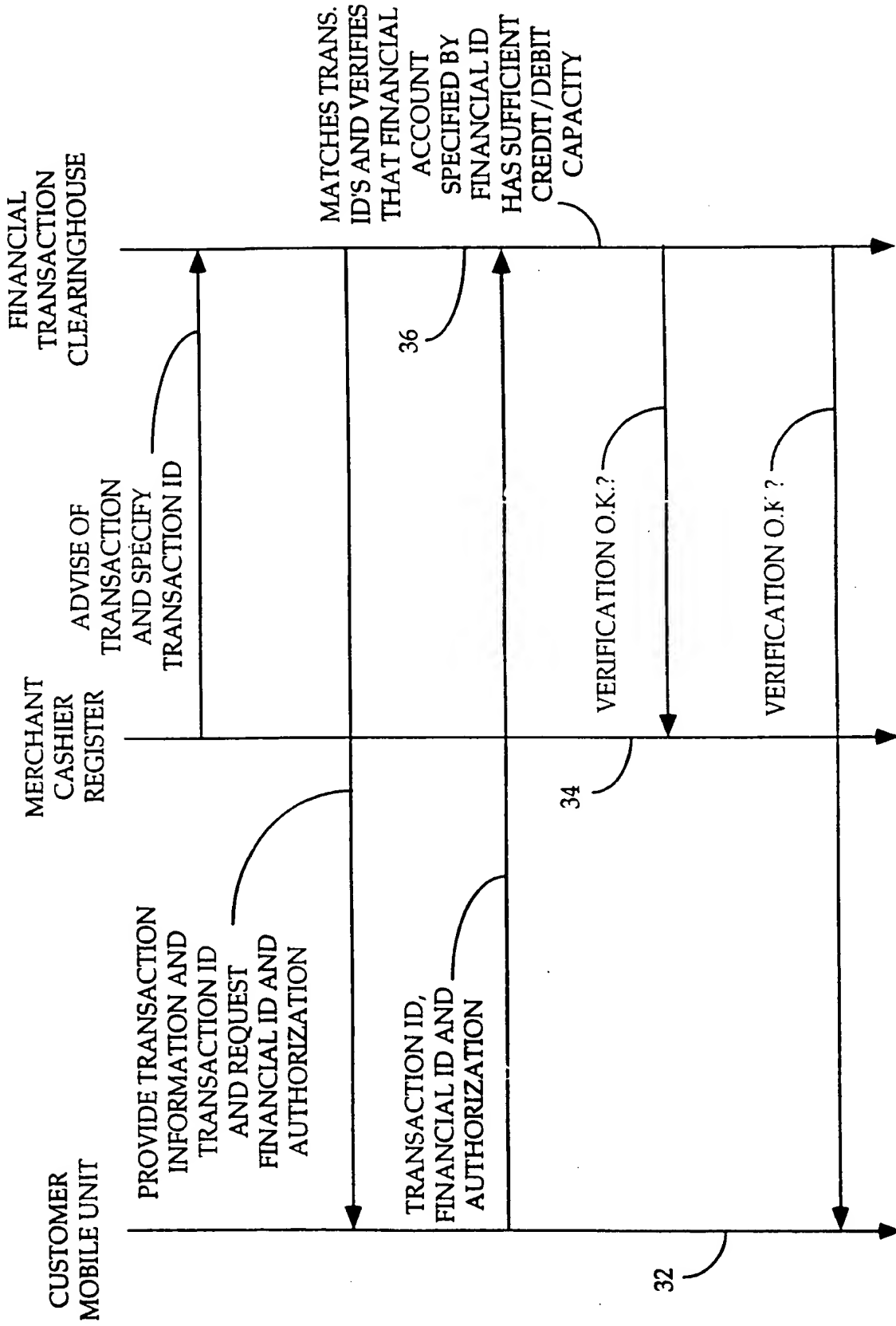


FIG. 5

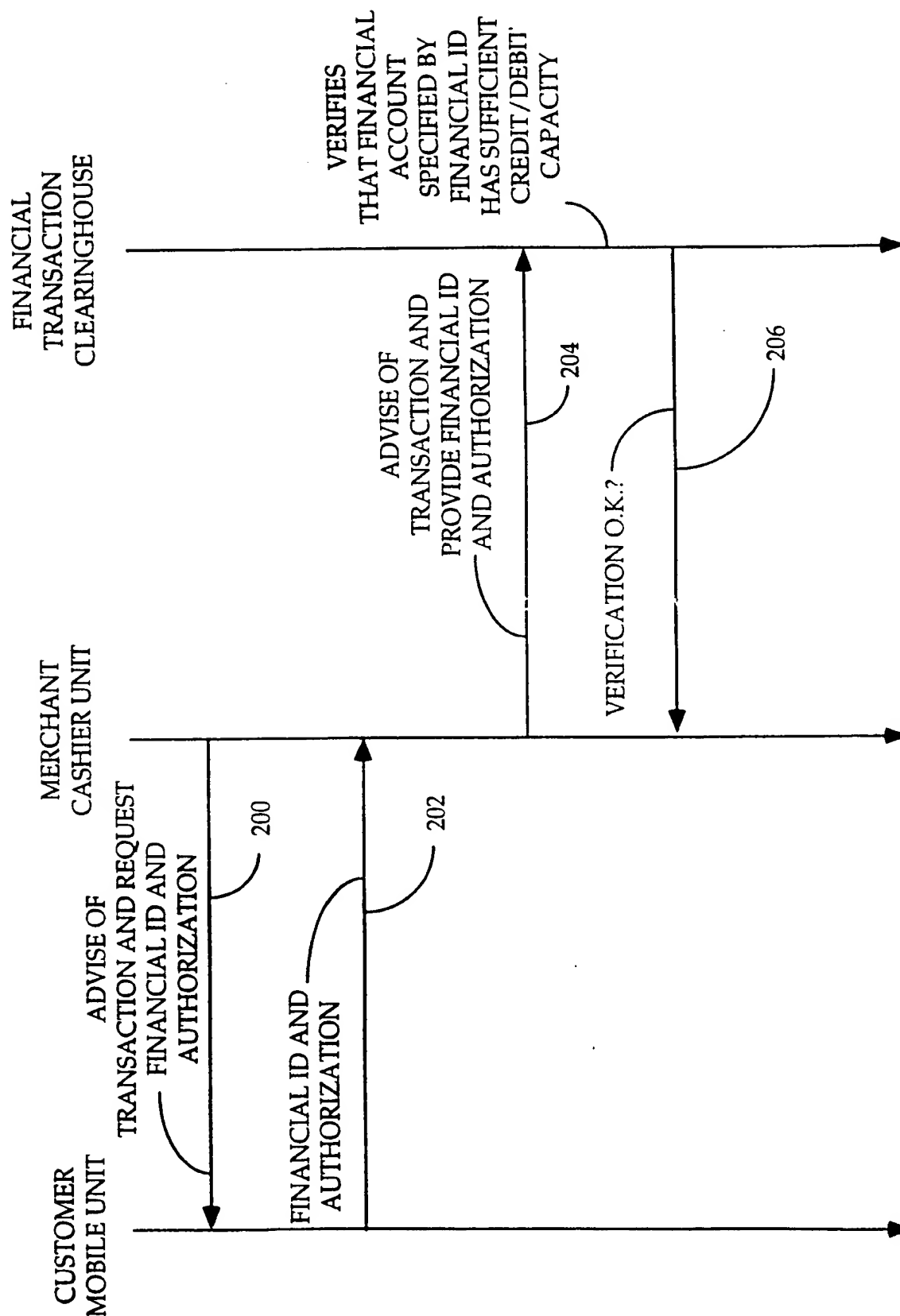


FIG. 6

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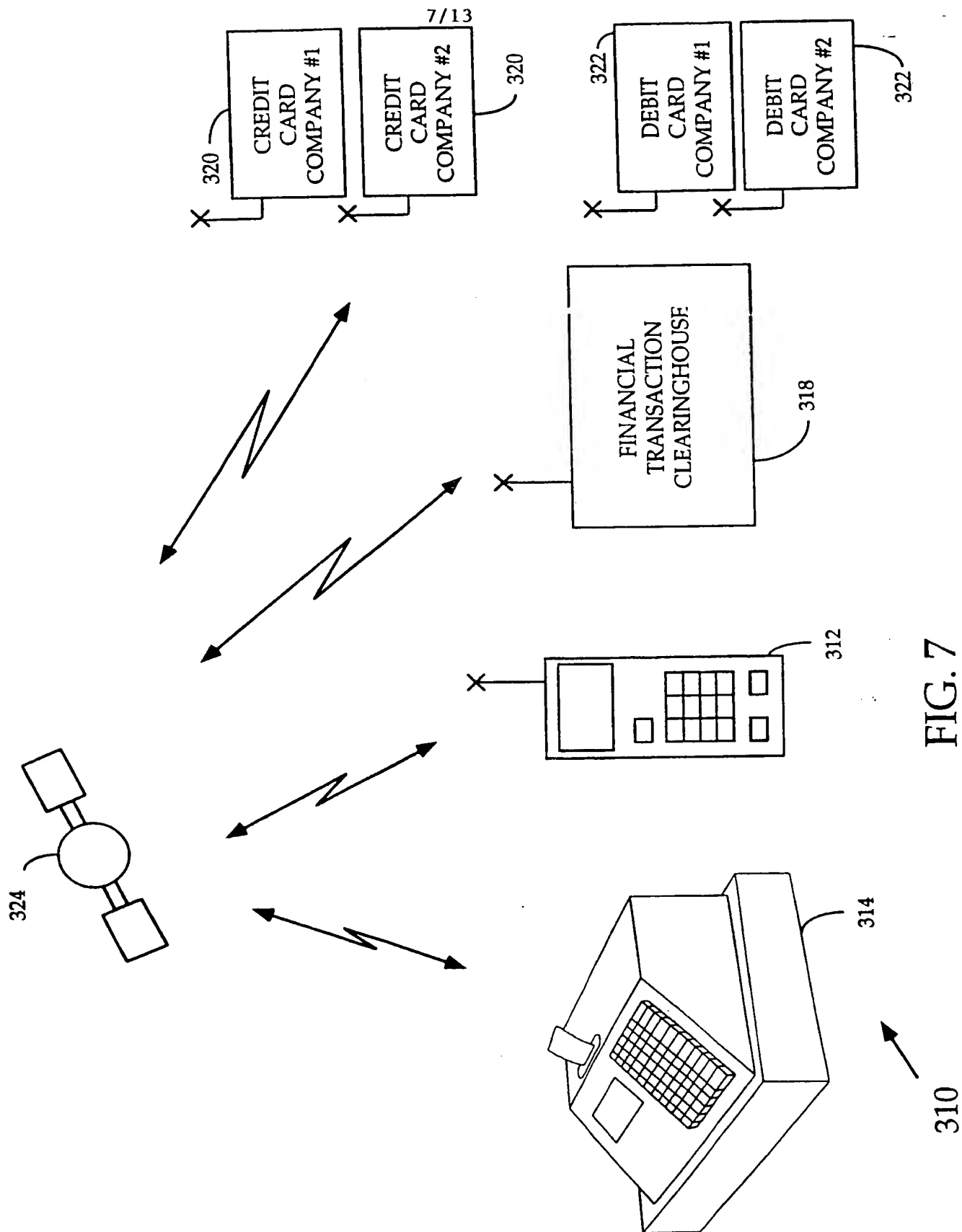
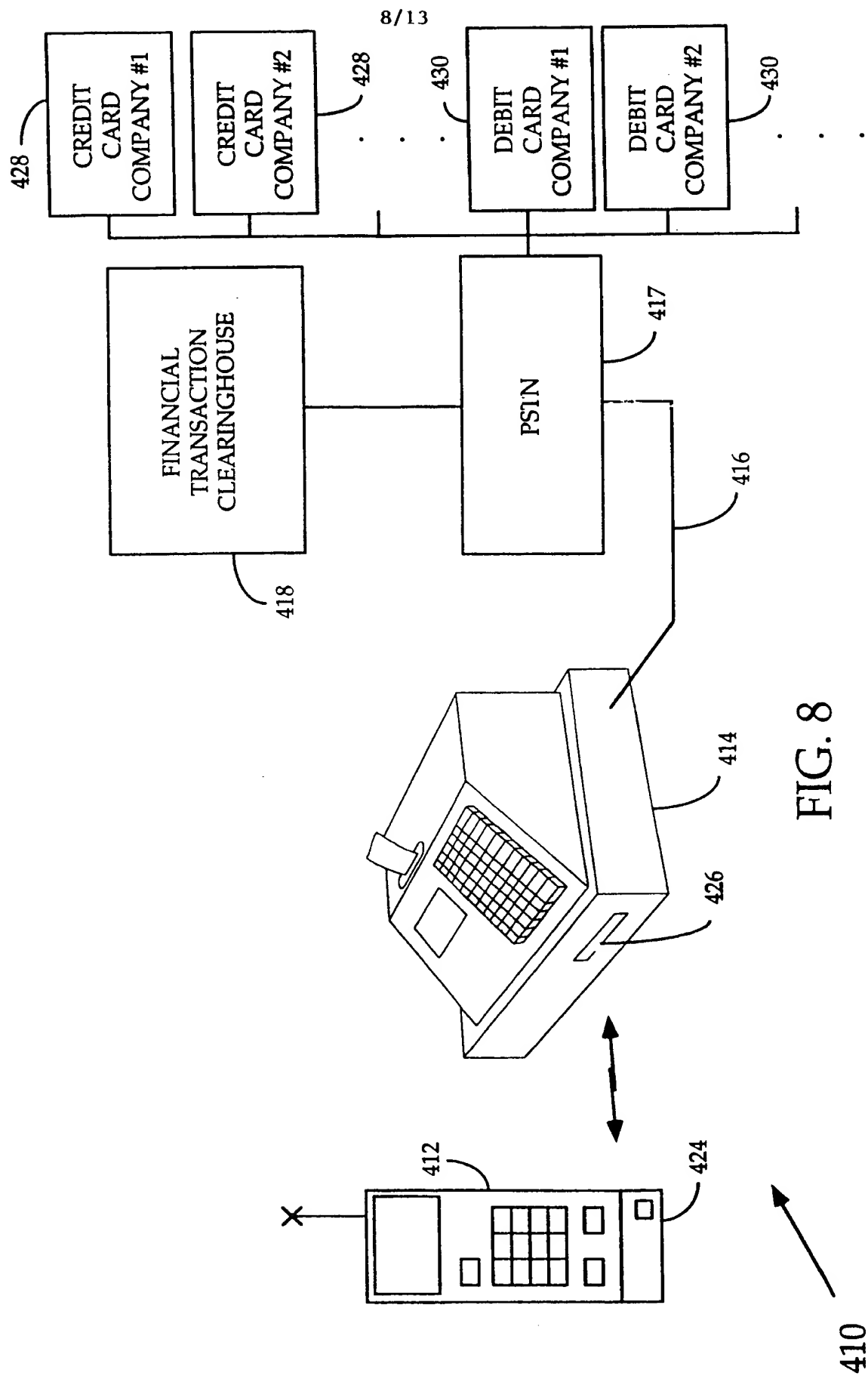


FIG. 7



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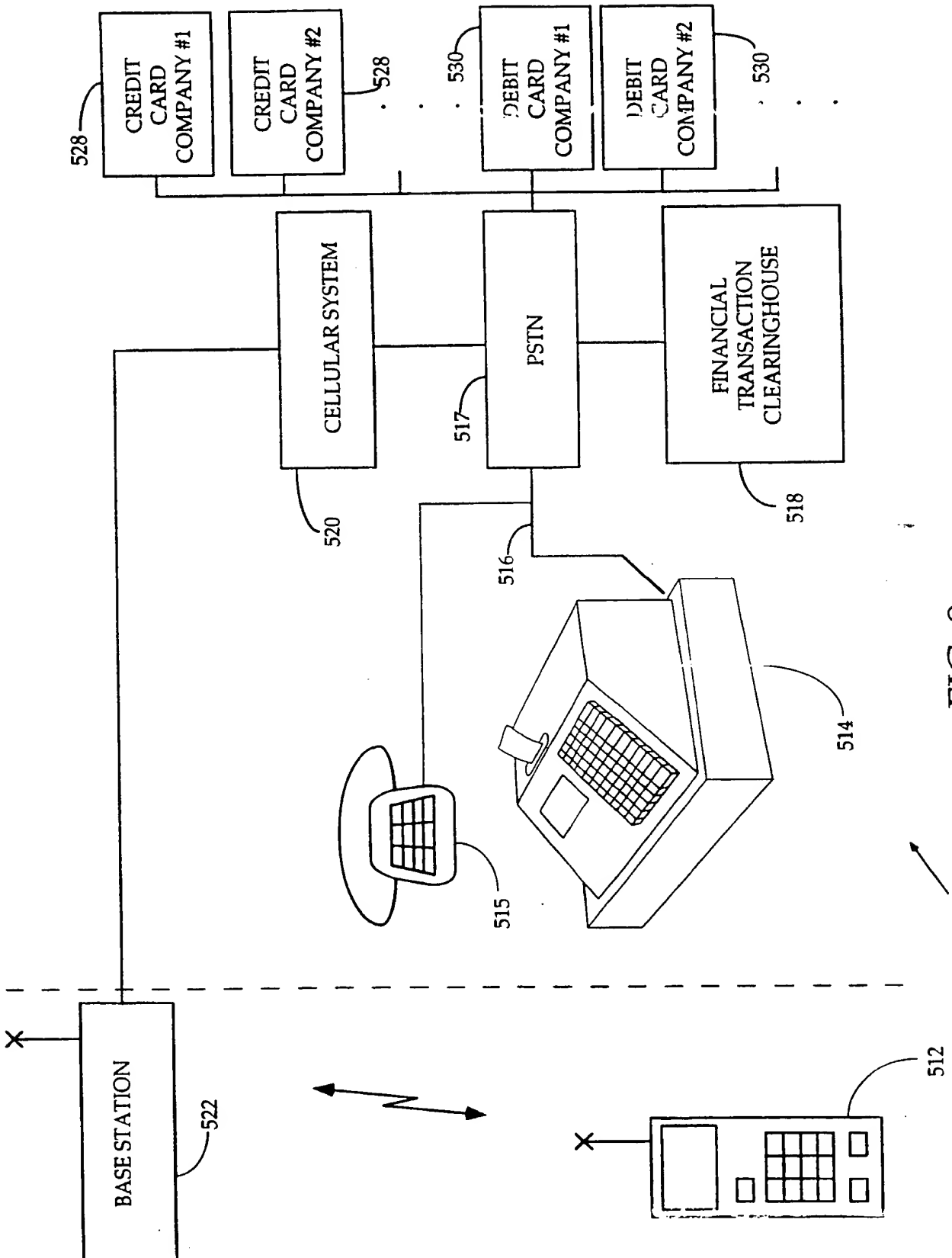


FIG. 9

510

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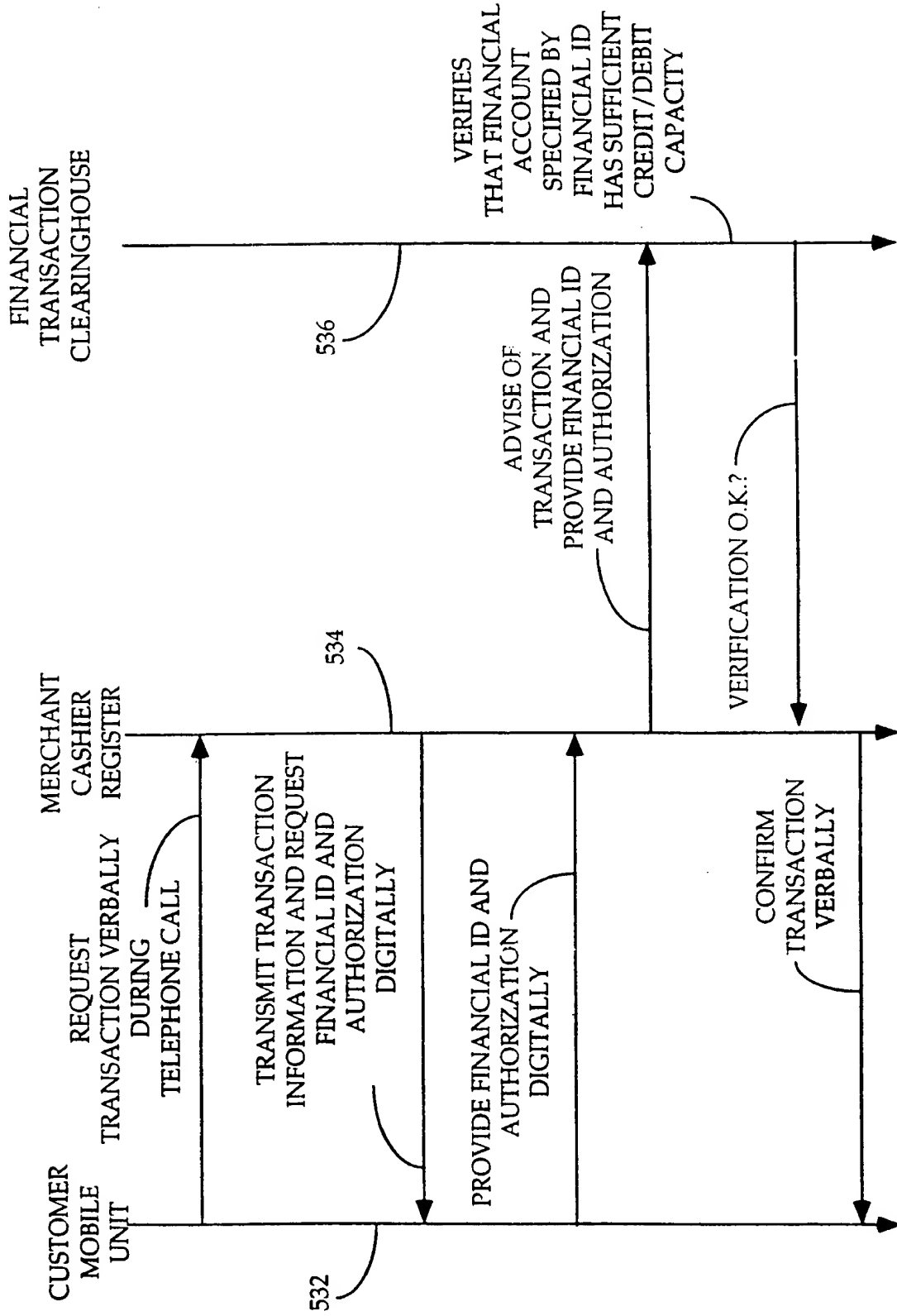


FIG. 10

END
TELEPHONE
CALL

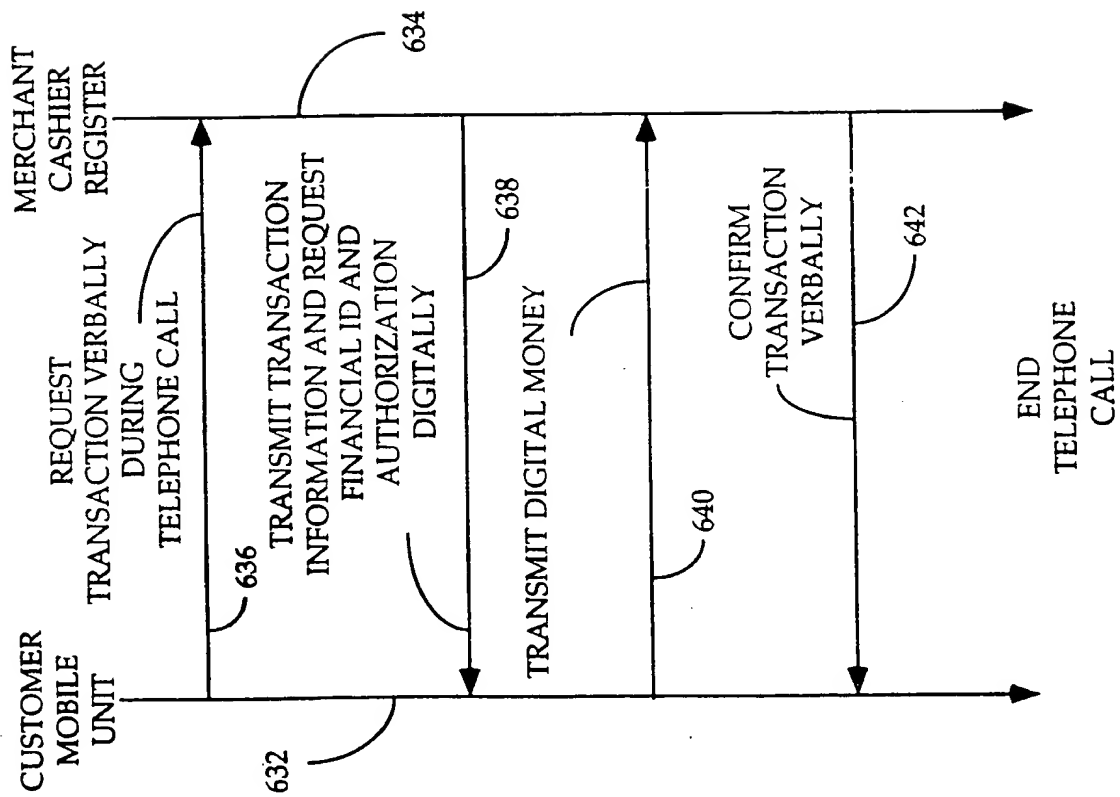
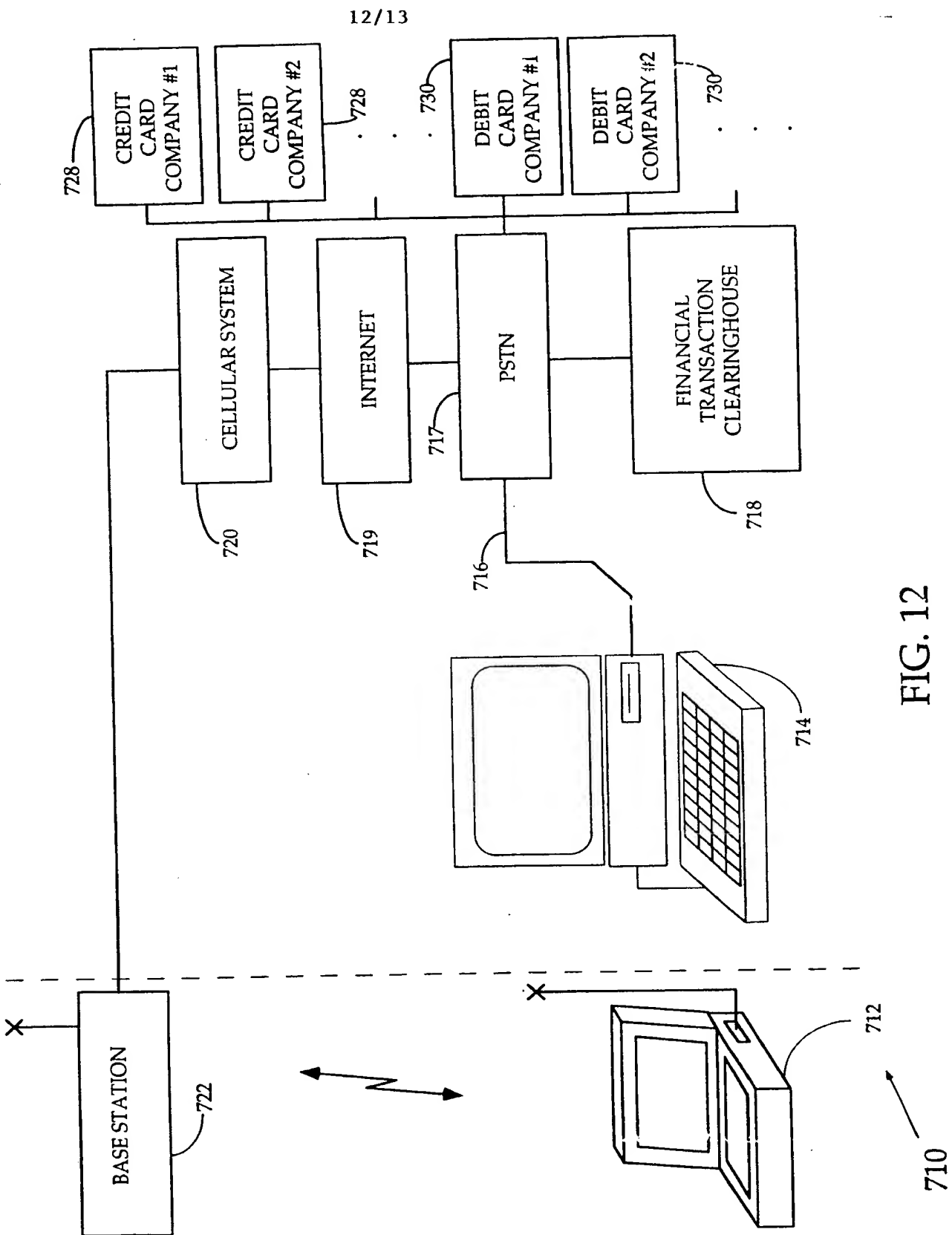


FIG. 11



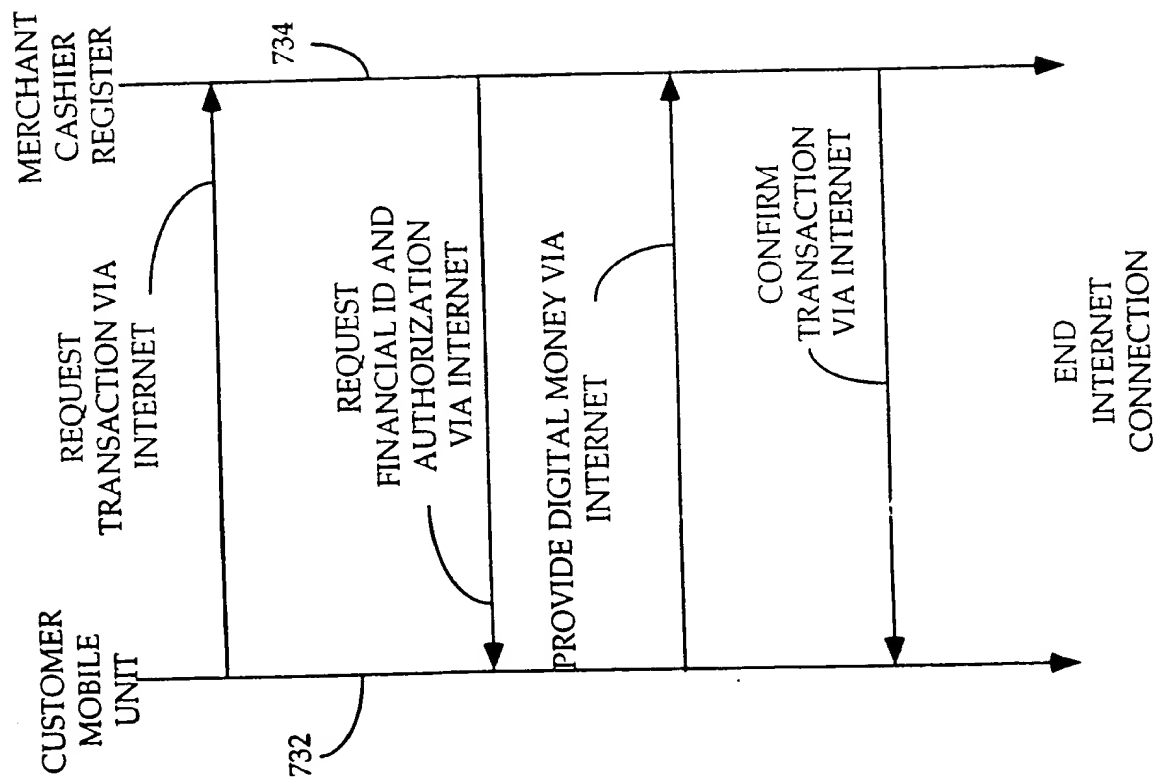


FIG. 13

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/01391

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 G07F19/00 H04M17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G07F H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WO 96 25828 A (NOKIA MOBILE PHONES) 22 August 1996 see abstract; claims; figures 1,6,7	1,3-7, 21,23-27 8,10-15, 19,20, 28,30-35
A	see page 13, line 3 - page 19, line 28 --- WO 94 11849 A (H.T. VATANEN) 26 May 1994	1,3,5,6, 9,10, 12-15, 19-21, 23,25, 26,29, 30,32-35
A	see abstract; claims; figures see page 5, line 36 - page 11, line 10 --- EP 0 708 547 A (AT & T) 24 April 1996 --- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

7 July 1998

Date of mailing of the international search report

15/07/1998

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Authorized officer

David, J

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/01391

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No. —
A	WO 96 13814 A (B. VAZVAN) 9 May 1996 -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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